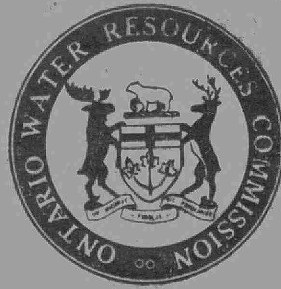
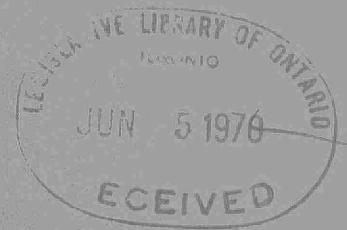


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Water Pollution
Survey

THE
ONTARIO WATER RESOURCES
COMMISSION



WATER POLLUTION SURVEY

of the

VILLAGE OF OIL SPRINGS

COUNTY OF LAMBTON

1969

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REPORT
on a
WATER POLLUTION SURVEY
OF THE
VILLAGE OF OIL SPRINGS
COUNTY OF LAMBTON

JUNE, SEPTEMBER 1969
DISTRICT ENGINEERS BRANCH
DIVISION OF SANITARY ENGINEERING

ONTARIO WATER RESOURCES COMMISSION

REPORT

INTRODUCTION

A water pollution survey of water quality in surface water drains and storm sewers in the Village of Oil Springs was conducted in June and September of 1969. Mr. F.W. Baines, Clerk-Treasurer, Village of Oil Springs, provided pertinent information and assisted with the investigation and sampling programme.

The purpose of the survey was to locate, record and evaluate existing and potential sources of pollution to watercourses. Where pollution sources are noted, recommendations are made regarding their abatement.

GENERAL

The Village of Oil Springs, with an assessed population of 544 (1969 Municipal Directory) is located on Highway #21, in the central portion of the County of Lambton. The municipality is approximately 2,000 acres in size.

In general, drainage waters from the Oil Springs area flow via municipal drains and storm sewers into Black Creek, a tributary of the Sydenham River. The approximate location of village drains, direction of flows and sampling

point locations are indicated on the accompanying map. The laboratory analyses results as well as an interpretation of the analyses can be found appended to the report.

Soil conditions in the municipality, as revealed by a soils map of the area, indicated that Brookston and Caistor clay constitute the predominate soils in the village. These soils have poor to imperfect drainage characteristics. Septic tanks and field tile disposal units in these areas will not function properly and cannot be considered to be a suitable method of domestic sewage disposal.

The Village of Oil Springs does not have an official plan at present. To encourage an interest in planning, Appendix C headed "Community Planning" has been included.

WATER SUPPLY

The potable water supply for the Village is obtained from 3 drilled wells and is distributed without treatment to approximately 187 services. In 1968, an average daily consumption of 44,981 gpd was recorded at the water works.

WATER POLLUTION

Sewage Treatment Facilities

The Village of Oil Springs utilizes individual septic tank systems on most properties as a means for treating sanitary wastes. In many cases, these systems do not operate effectively as the poor drainage characteristics of the predominately clay

soil conditions impair the functions of field tile disposal beds. To add to this condition, there are small lots in portions of the built up areas of the Village, where sufficient land is not available for the installation of adequate field tile disposal beds. Consequently, direct connections from private disposal units to surface water drains have been made illegally. This has resulted in the discharging of inadequately treated sanitary sewage into local surface water drainage systems.

Surface Water Drainage

A total of seven surface water drains were examined for water quality. The examination entailed the sampling of these points followed by chemical analyses and bacteriological examination at the Ontario Water Resources Commission laboratories in Toronto.

The results of the aforementioned tests indicated that all the surface water drains or storm sewers sampled contained high values of *biochemical oxygen demand, *suspended solids and *coliform organism counts.

*Anionic detergent concentrations (as ABS) were found at the above-mentioned points with concentrations ranging from 1 to 11 ppm.

* See Appendix A for explanation of terms.

Black Creek

The sample analyses results from this creek indicated an increase in biochemical oxygen demand as its waters passed through the predominately built up area of the village.

DISCUSSION

From the results of the chemical and bacteriological analyses performed on the samples collected during the investigations, it is evident that the Village of Oil Springs is contributing to the pollution of Black Creek.

Because of the poor drainage characteristics associated with the clay soil conditions plus the small lots in portions of the built up area of the village, the individual septic tank systems are discharging partially treated waste waters to adjacent surface water drains.

In order to alleviate this situation, it is recommended that the Village of Oil Springs consider the installation of a municipal sewage works system. The methods of implementing such a programme are outlined in Appendix B.

SUMMARY

A water pollution survey was conducted in the Village of Oil Springs during June and September 1969.

The results of the survey indicate that the Village of Oil Springs is contributing to the pollution of the surface

water drains and Black Creek by the discharging of domestic waste into the above watercourses.

In order to terminate pollution of this nature, the implementation of a municipal sewage works programme is required.

RECOMMENDATION

It is recommended that a sewage works programme be initiated as outlined in this report as soon as possible.

Prepared by

W. L. Talbot, C.E.T.

Division of Sanitary Engineering

WLT/hk

TABLE IVILLAGE OF OIL SPRINGSWATER POLLUTION SURVEYMUNICIPAL SURFACE WATER DRAINSOUTFALLS TO BLACK CREEK

<u>Sampling Point No.</u>	<u>Description of Sampling Point</u>	<u>5-Day BOD (ppm)</u>	<u>Solids (ppm)</u>			<u>Anionic Detergent as ABS (ppm)</u>	<u>Total Coliforms Per 100 ML (Membrane Filter)</u>
			<u>Total</u>	<u>Diss.</u>	<u>Susp.</u>		
SYNB 34.9D	Open Drain at Highway #21 and Black Creek.	20	970	80	890	2	1,010,000
SYNB 35.1D	Open Drain north of Main Street between Hanna and Elizabeth Streets.	28	730	50	680	1	1,680,000
SYNB 35.6D	Open Drain - N.E. corner of Main Street Bridge at Black Creek.	26	740	40	700	5	6,700,000
SYNB 35.8W	Sanborn Street Drain	180	780	60	720	11	510,000,000
SYNB 35.6W	Storm Drain - S.W. corner of Main Street Bridge at Black Creek.	44	700	120	580	5	72,000,000
SYNB 35.61W	Storm Drain - Between Richmond & Victoria Street.	65	760	40	720	7	13,700,000
SYNB 35.62I	De Mers Company Waste Water.	18	5420	40	5380	Phenols in PPb = 15 Ether Solubles in PPM = 15	

TABLE II

VILLAGE OF OIL SPRINGS

WATER POLLUTION SURVEY

BLACK CREEK

<u>Sampling Point No.</u>	<u>Description of Sampling Point</u>	<u>5-Day BOD (ppm)</u>	<u>Solids (ppm)</u>			<u>Anionic Detergent As ABS (ppm)</u>	<u>Total Coliforms Per 100 ML (Membrane Filter)</u>
			<u>Total</u>	<u>Diss.</u>	<u>Susp.</u>		
SYNB 35.9	18 side Road Bridge - Upstream from Built-Up Area.	2.0	1785	35	1750	0.1	600
SYNB 35.6	Main Street Bridge	3.0	1760	70	1690	---	160,000
SYNB 34.9	Highway #21 - Downstream from Built-Up Area.	5.0	1320	50	1270	0	90,000

APPENDIX A

SIGNIFICANCE OF LABORATORY RESULTS

APPENDIX A

SIGNIFICANCE OF LABORATORY ANALYSES

BACTERIOLOGICAL EXAMINATION

The presence of coliforms indicates pollution from human or animal excrement, or from some non-faecal forms. The objective for surface water quality in Ontario is maximum of 2400 organisms per 100 millilitres.

The OWRC Laboratories employ the Membrane Filter (MF) technique of examination to obtain a direct enumeration of coliform organisms.

SANITARY CHEMICAL ANALYSES

Biochemical Oxygen Demand (BOD)

Biochemical Oxygen Demand is reported in parts per million (ppm) and is an indication of the amount of oxygen required for the stabilization of decomposable organic or chemical matter in water. The completion of the laboratory test required five days, under the controlled incubation temperature of 20° Centigrade.

The OWRC objective for surface water quality is an upper limit of four (4) ppm.

Solids

The value for solids, expressed in parts per million (ppm) is the sum of the values for the suspended and the

dissolved matter in the water. The concentration of suspended solids is generally the most significant of the solids analyses with regard to surface water quality.

The effects of suspended solids in water are reflected in difficulties associated with water purification, depositions in streams and injury to the habitat of fish. Where suspended solids values are less than 20 ppm, laboratory difficulties are experienced and the turbidity is determined instead.

Turbidity

Turbidity is caused by the presence of suspended matter, such as clay, silt, finely divided organic matter, plankton and other microscopic organisms in water. It is an expression of the optical property of a sample and the results are reported in "Turbidity units".

PHYSICAL DETERMINATIONS

Dissolved Oxygen

The amount of dissolved oxygen contained in unpolluted water fluctuates with the temperature. A deficiency of oxygen in water is replaced by oxygen from the atmosphere. There is a saturation value for each temperature. At 18° C this is 9.54 ppm of dissolved oxygen. Values below the saturation level indicate the presence of polluting organic substances which are absorbing oxygen from the water. The extent of this

deficiency is one index of the degree of organic pollution. Substantial reduction in dissolved oxygen causes suffocation of fish.

Temperature

The temperature of water influences the solubility of oxygen and the rate of oxidation and purification.

Anionic Detergent (ABS)

The presence of anionic detergent generally indicates pollution from domestic sources.

Abbreviations and Symbols

Engineering Terms

ABS - Alkyl benzene sulfonate
BOD - Biochemical oxygen demand
gpd - Gallons per day
mgd - Million gallons per day
ppm - parts per million
ppb - parts per billion
ml - millilitre
MF - Membrane filter

Miscellaneous

Diss. - Dissolved
No. - Number
Susp. - Suspended

APPENDIX B

IMPLEMENTATION OF WATER AND SEWAGE WORKS PROGRAMMES

AND

A STATEMENT BY THE HONOURABLE GEORGE A. KERR, Q.C.

REGARDING

TWO MAJOR FINANCIAL PROGRAMMES TO ASSIST MUNICIPALITIES

IN PROJECTS RELATED TO SEWAGE AND WATER WORKS

APPENDIX B

IMPLEMENTATION OF WATER AND SEWAGE WORKS PROGRAMMES

Currently, there are three general methods which may be utilized for implementing sewage and water works programmes. These are: (1) to enter into an agreement with the OWRC for the construction of the treatment and collector works with an obligation to pay the debt retirement and operating charges over the term of the agreement with the facility reverting to the municipality at the end of the term of the agreement, (2) by requesting the provision of service from a Provincially-owned project, and (3) by proceeding with the construction independently and meeting capital costs by the sale of debentures.

OWRC/MUNICIPAL PROJECTS

For the construction of water and sewage works under agreement with this Commission, the works are provided and developed under Section 39 to 46 of the Ontario Water Resources Commission Act.

For this type of arrangement, the Commission utilizes a sinking fund and consequently the annual payments are based on a specific debt retirement period and the payments are unchanged for the period of the agreement. This type of project may be financed over a period of time up to a maximum of

thirty years. The annual charges for projects constructed under this agreement are determined as follows:

1. Capital Repayment

As noted, OWRC financing is by the sinking fund method and an annual payment of approximately 2 per cent of the capital cost is required to retire a debt over a thirty-year period.

2. Interest

On new Commission projects, interest is calculated at the current rate.

3. Reserve Fund

To provide money for repairs and replacements, Section 40 of the Ontario Water Resources Commission Act provides for the establishment of a reserve fund by the Commission. It is important to note that this fund is established in the name of the municipality and the balance consequently earns interest. It has now been established by Commission minute that the reserve fund billing for each project shall continue only until the fund reaches an amount of ten times the initial annual billing and the

reserve fund billing shall be re-imposed only when the fund has been depleted to 80 per cent or less of the maximum amount.

4. Operating Costs

Under OWRC agreement, the municipality is responsible only for the operating costs directly attributed to the project in the municipality. Therefore, no charges are made by the Commission for the services of head office personnel who are available as required to advise on the satisfactory operation and maintenance of the project.

PROVINCIALY-OWNED WORKS

In June, 1967, the Honourable J.R. Simonett, Minister of Energy and Resources Management, made an announcement which expanded the authorization of this Commission for the provision of water supply and sewage treatment facilities. This new programme allows the Commission to construct entire water and sewage works facilities for small municipalities. The capital costs of these can be amortized over a 40-year period.

A slight variation of this programme could be implemented in that the municipality may request that this Commission provide only the major water and sewage works facilities as

Provincially-owned works, and develop the water distribution and sewage collector systems under the standard type of Commission project. It would appear that where applicable, it would be more advantageous for the municipality to proceed on the basis of requesting this Commission to develop entire systems as Provincially-owned works.

The associated cost of supplying these works, including amortization of capital costs, together with operating and maintenance charges, will be recovered by the sale of service to the affected municipalities by rates determined on a usage basis. These facilities will be wholly owned by the Province of Ontario and the arrangements for service will be formalized by contracts between the Commission and the municipality concerned. The installations will be operated entirely at cost with appropriate provision for adjustment in rate.

DEVELOPMENT

If a municipality, after considering the alternatives, wishes this Commission to consider Provincially-financed projects, application forms should be completed and submitted together with a resolution of the municipal council. A draft of the suggested wording of the resolution is included with the application forms.

If the proposed works are to be built by the municipality on its own initiative or as a formal project under agreement with this Commission, it is required that the council retain a consulting engineer to prepare preliminary engineering reports on the proposed work. If a Provincial system is contemplated, no action should be taken with respect to retaining a consulting engineering firm as the Commission will designate a consulting engineer to carry out the Provincial portion of the work and it would be advantageous if the municipal portion be studied and reported on by the same engineer.

STATEMENT

BY

THE HONOURABLE GEORGE A. KERR, Q.C.
MINISTER OF ENERGY AND RESOURCES MANAGEMENT

REGARDING

TWO MAJOR FINANCIAL PROGRAMMES
TO ASSIST MUNICIPALITIES IN PROJECTS
RELATED TO SEWAGE AND WATER WORKS

THURSDAY, OCTOBER 16, 1969

Mr. Speaker:

On behalf of the Government, I am pleased to announce the approval of two major financial programmes to assist municipalities in projects related to sewage and water works.

Approval has now been given to a submission by the Ontario Water Resources Commission that some assistance be granted by the Government of Ontario to small municipalities with high cost projects so that sewage and water works may be built for these communities. The programme approved will provide Provincial assistance sufficient to ensure that the cost of a sewage works in a municipality will not exceed an average home charge of \$120 per year. The communities requiring such assistance are ones facing unusually high costs because of topography, type of soil or rock, which increases the charges for construction, or those with a small population and low assessment. The Provincial assistance programme will ensure, where necessary, every municipality in Ontario will be able to have essential water and sewage works regardless of size.

In water servicing, when costs rise above \$100 per average home per year for a community, the Province will grant assistance. The maximum contribution by the Province for both water and sewage works may not be greater than 50% of the total

cost of the works. There may be a few cases, therefore, in very high cost projects, that the 50% grant may not be sufficient to meet all costs above \$120 or \$100 per year for sewage and water respectively. An example is Haliburton, where Provincial participation of an estimated \$739,000 will not be sufficient to reduce the sewage charge to \$120. The original charge of \$311 per home will be reduced, however, to \$155 per home by the application of this formula.

The importance of providing this assistance will be appreciated by the Honourable Members of this House, since there are a number of communities willing to install essential sewage and water works, but which find the costs are beyond their financial capacity to do so. In some cases the Ontario Municipal Board has had to ask that such projects be postponed because the project was beyond the financial capacity of the small community, even with Provincial assistance through OWRC financing.

I believe that everyone in the province agrees that the programme to control pollution must ensure that all municipalities have adequate sewage treatment works. It is not realistic today to permit a small community, already established for many years, to go without the necessities of pure water

supply and treatment of wastes. Downstream users will benefit directly from such projects. Provincial assistance will average approximately 30% of the cost for municipalities under 5,000 population. In the year 1970-71 the Provincial assistance would cost an estimated \$3,000,000 for both sewage and water systems, rising to \$12,000,000 in 1971-72 because of the backlog of projects which will get underway at that time. It should decrease in the years after that.

I want to stress to Honourable Members that Provincial assistance for such small municipalities is to assist the existing community only and is for new works. The programme would not apply to any future addition or extension of such new plant. In other words the province will work itself out of this problem by assisting those who need assistance now. The rate of \$120 for sewage per average home per year is above the cost of any of the larger communities who have either financed their own works or constructed such works with Provincial assistance. The subsidy, therefore, does not create an advantage for small communities over the larger ones. I believe all members will agree that this is an excellent programme, indicating the seriousness with which the Ontario Government views the importance of establishing such works in all communities requiring them.

The Government has also approved a proposal for financial assistance to ensure that area projects for sewage and water may be oversized for future developments. To qualify, the oversizing must be beyond the needs of communities initially serviced. This is really in accordance with proper planning and engineering design principles and will ensure that adequate services will be available for the predicted population. Under this plan, the province may contribute 15% of the total capital cost of works.

We are facing such possible expansion in the areas of Sarnia and St. Thomas. An additional expenditure of approximately 15% will permit area schemes to substantially increase in capacity. This assistance will be granted after a careful review of the programme to ensure that growth in the area is in the best interests of the province. To date this assistance applies to the works constructed to serve the Lake Erie-St. Thomas line, which will provide connections to the communities of Port Burwell, Southwold, Yarmouth, as well as St. Thomas and the industrial concerns north of St. Thomas. It also applies to the Lambton-Sarnia area water system, and permits increased capacity to be built into this line to service the Townships of Sarnia, Moore and Sombra and the communities of Corunna,

Courtright, Sombra, Port Lambton and Brigden. The OWRC is presently studying such oversizing for a system in the Eastern Lake Erie Section north of Nanticoke.

It is becoming increasingly apparent to me that area programmes will become more essential, particularly guaranteeing water supply for communities inland of the Great Lakes. It is no longer adequate for us to rely on ground water supply alone for rapidly developing Ontario communities. The increased capacity of such area programmes will permit both residential and industrial development to take place with advanced planning by those directly involved, under the general direction of the Department of Municipal Affairs.

The Government of Ontario is pleased to announce these new policies. This statement is to indicate to the House the seriousness with which we view the needs of servicing Ontario communities. The results can only be to the benefit of the entire province.

APPENDIX C

COMMUNITY PLANNING

APPENDIX C
COMMUNITY PLANNING

The need for effective planning has become more important today than ever before. Municipalities are being burdened with the rising costs of land and labour. Therefore, any project a community hopes to develop should be based on sound planning. Planning at all levels of government is essential but, community planning can be most effective if interest and initiative is generated at the local level. The enormous benefits accrued as a result of good planning can more than compensate for the initial investment.

Community planning can be described as an effort to control and direct development effectively. This can best be achieved through the development of an official plan. An official plan is the stated intention of the local authorities with respect to orderly development within the planning area, that is prepared and set forth with professional assistance and meets the requirements as set out by the Provincial Planning Act. An official plan can be a joint effort by a number of municipalities which have common basic characteristics and common problems, or one municipality can establish a plan on its own initiative.

Orderly development yields future economy in services. Development in the community can be retarded where an official

plan does not exist. A plan provides, among other things, the framework for the rational design of water and sewage works and also the extensions of mains and collector sewer systems.

A local council having decided to proceed with a programme of community planning definitely should contact the Ontario Department of Municipal Affairs. Through its many branches, information and guidance is provided to all interested parties.

TOWNSHIP OF ENNISKILLEN

VILLAGE LIMIT

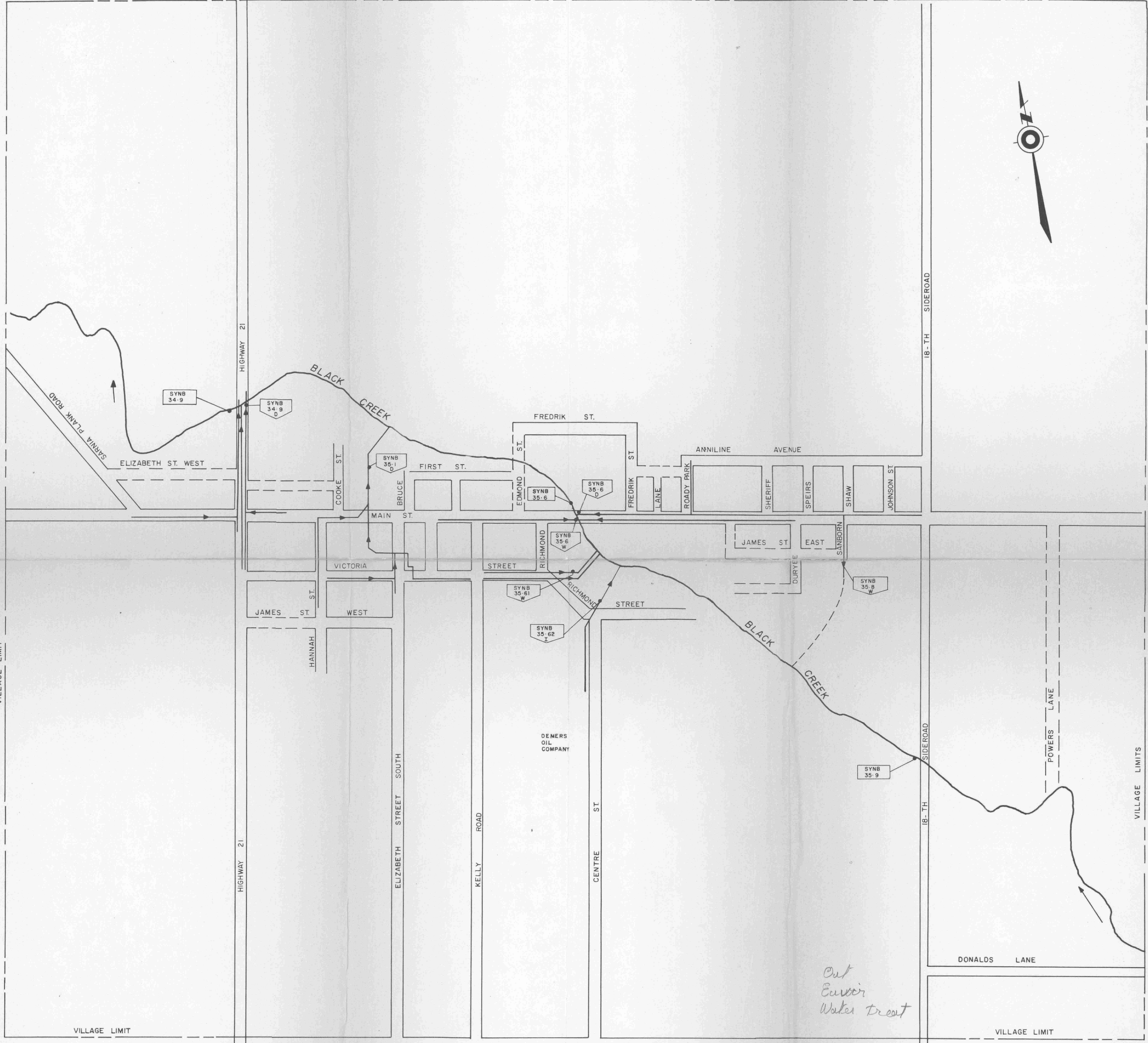


TOWNSHIP OF ENNISKILLEN

VILLAGE LIMIT

TOWNSHIP OF ENNISKILLEN

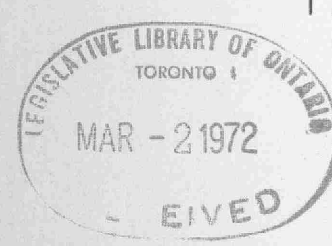
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TOWNSHIP OF ENNISKILLEN

LEGEND

- SYNB 34.9 - SAMPLING POINT SHOWING STREAM AND MILEAGE
- SYNB 34.9 - STREAM AND MILEAGE AT OUTFALL
- SYNB 34.9 - TYPE OF OUTFALL
- OUTFALL SYMBOL LETTERS
 - D - DITCH
 - I - INDUSTRIAL
 - W - STORM SEWER



ONTARIO WATER RESOURCES COMMISSION

VILLAGE OF OIL SPRINGS
WATER POLLUTION SURVEY
1969

SCALE: 0 500 1000 FT

DRAWN BY: M. Super
CHECKED BY:
DATE: JULY, 1969
DRAWING No.: 69-89-DE.



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